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Armstrong

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(54) **APPLIANCE WITH VERTICALLY ADJUSTABLE RACK**

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(51) **Int. Cl.**

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A47B 57/06	(2006.01)
A47B 57/08	(2006.01)
A47B 57/10	(2006.01)

(52) **U.S. Cl.**

CPC ***F24C 15/16*** (2013.01); ***A47B 57/06*** (2013.01); ***A47B 57/08*** (2013.01); ***A47B 57/10*** (2013.01)

(58) **Field of Classification Search**

CPC F24C 15/16; A47B 57/06; A47B 57/08; A47B 57/10

See application file for complete search history.

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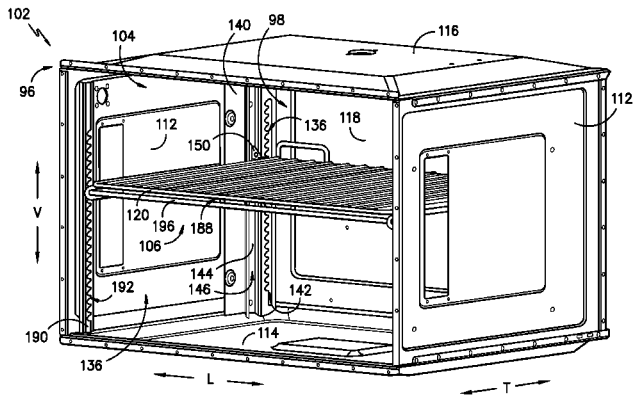
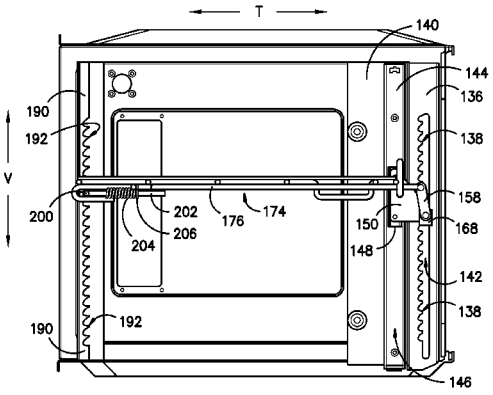
(57) **ABSTRACT**

An appliance is provided having one or more racks or shelves the position of which may be adjusted vertically. Multiple different positions along the vertical direction can be made available for selection by a user of the appliance. The rack can also be supported from multiple locations to increase its load capacity.

18 Claims, 9 Drawing Sheets





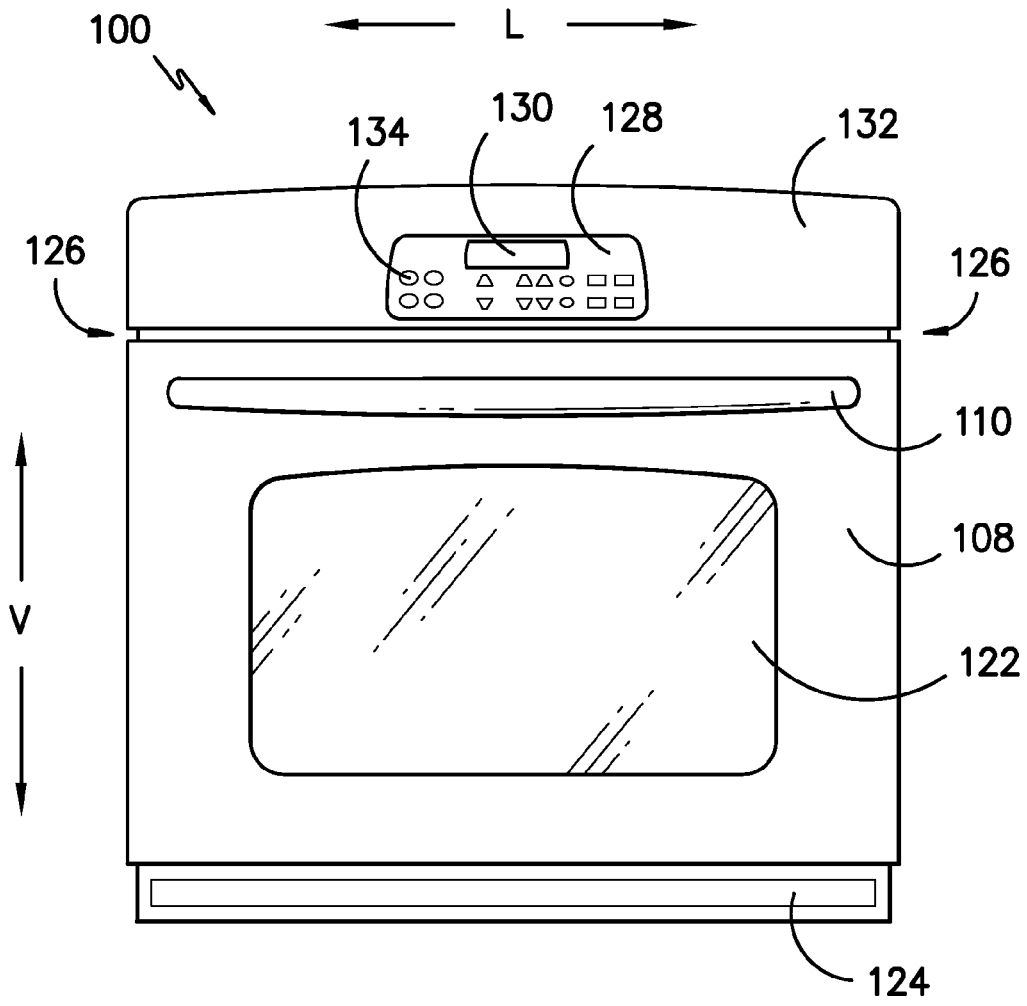


FIG. –1–

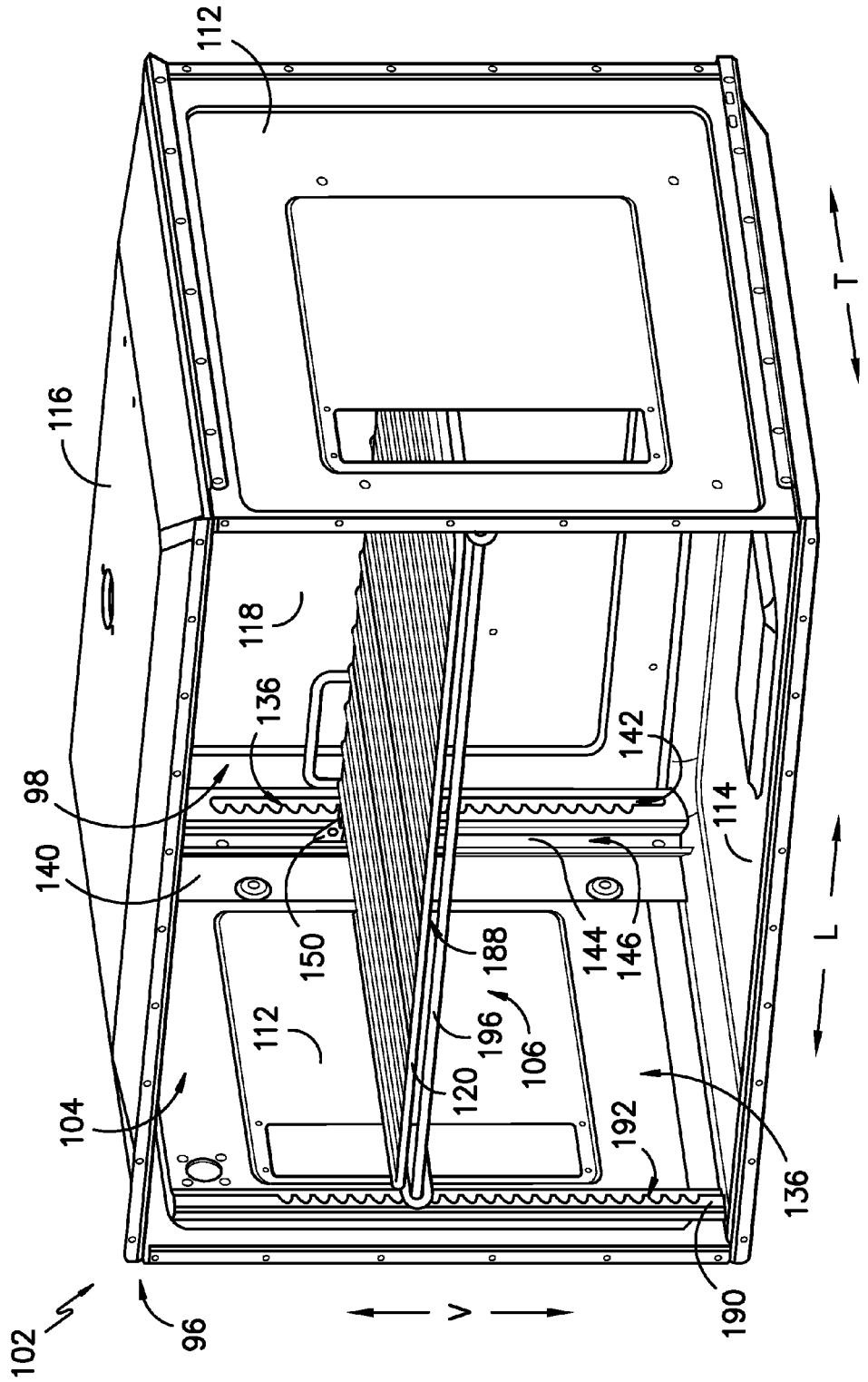

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FIG. -2-

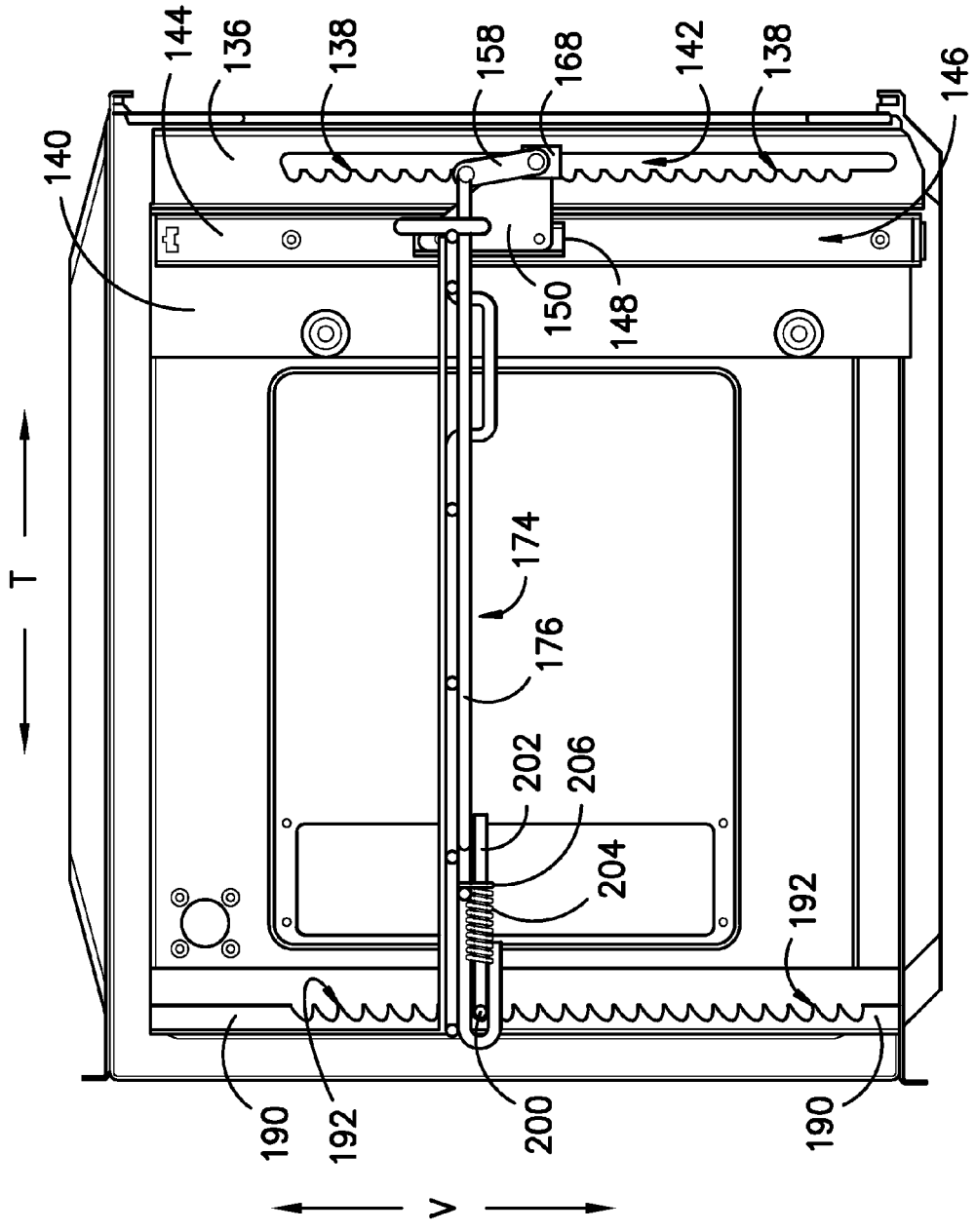
144
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FIG. -3-

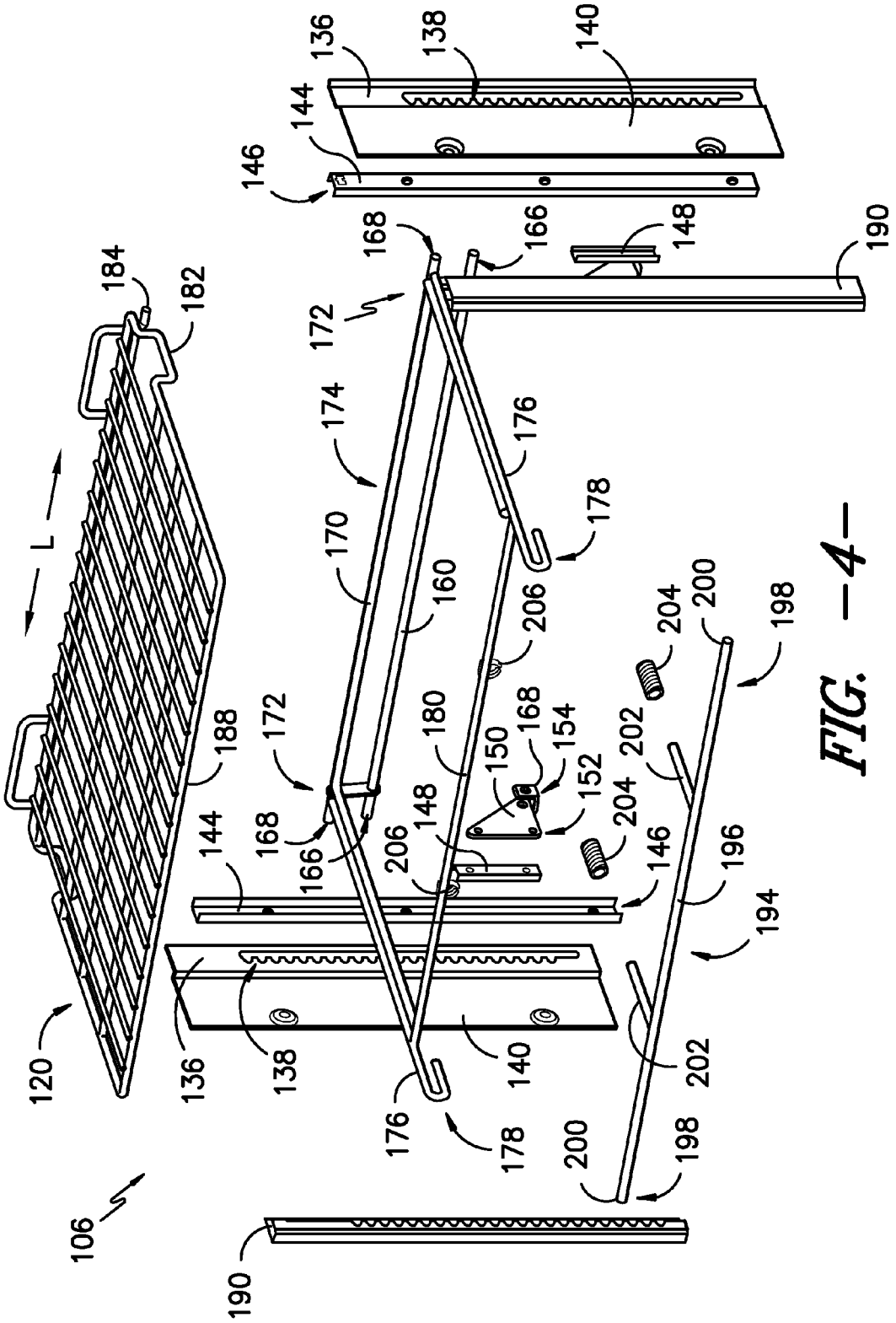
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FIG. —4—

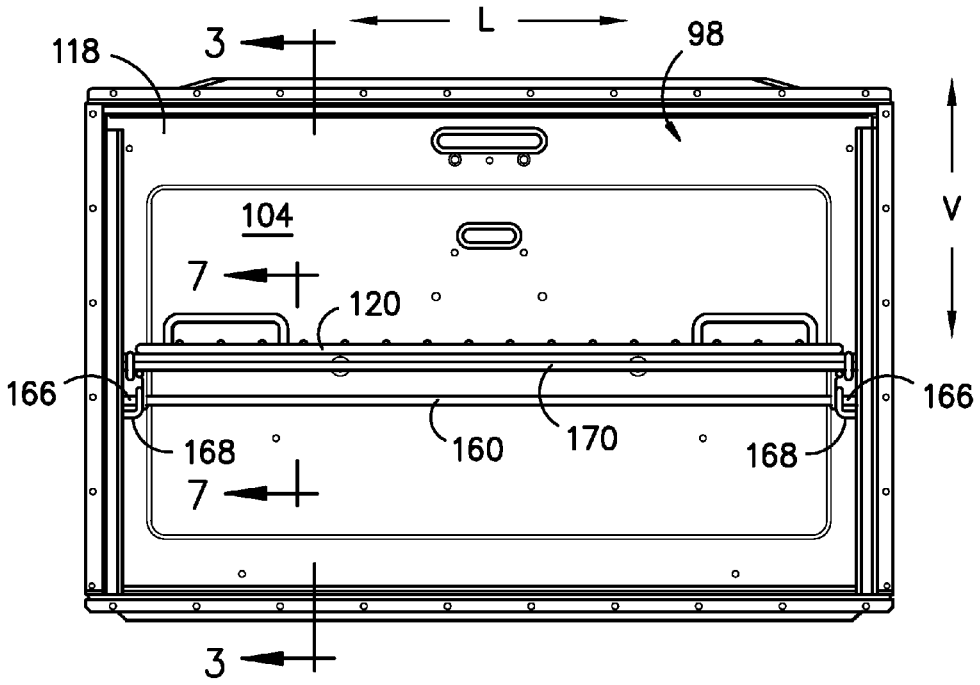
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FIG. –5–

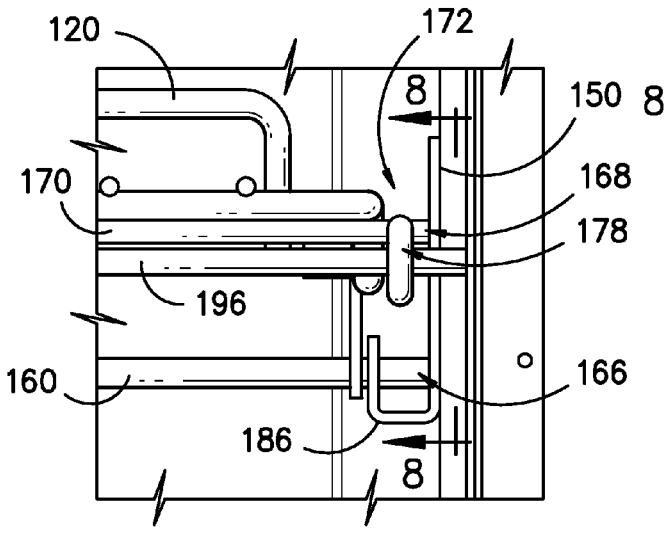
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FIG. –6–

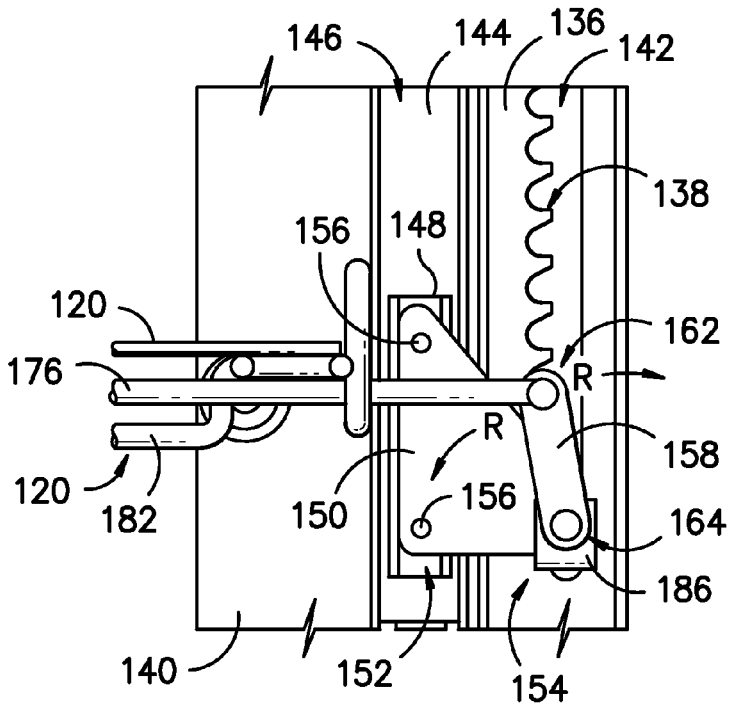
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FIG. —7—

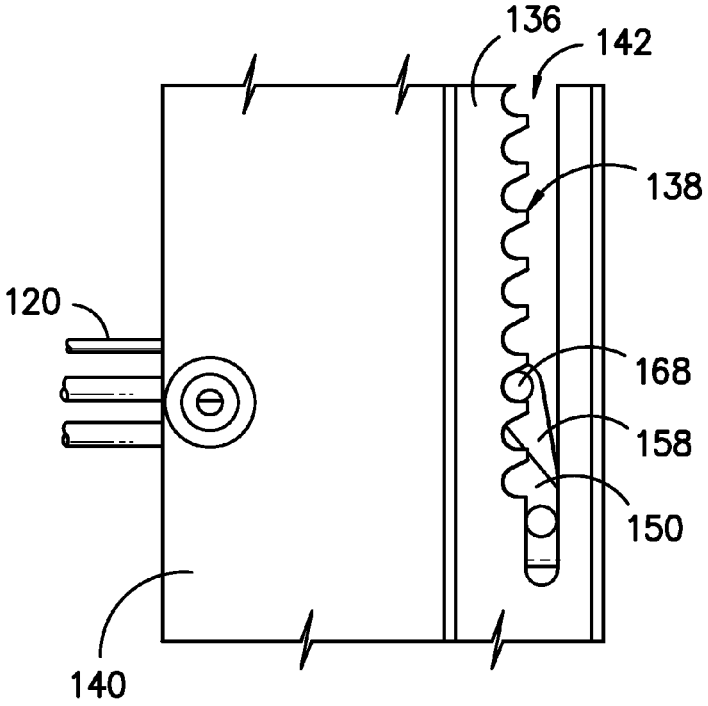
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FIG. —8—

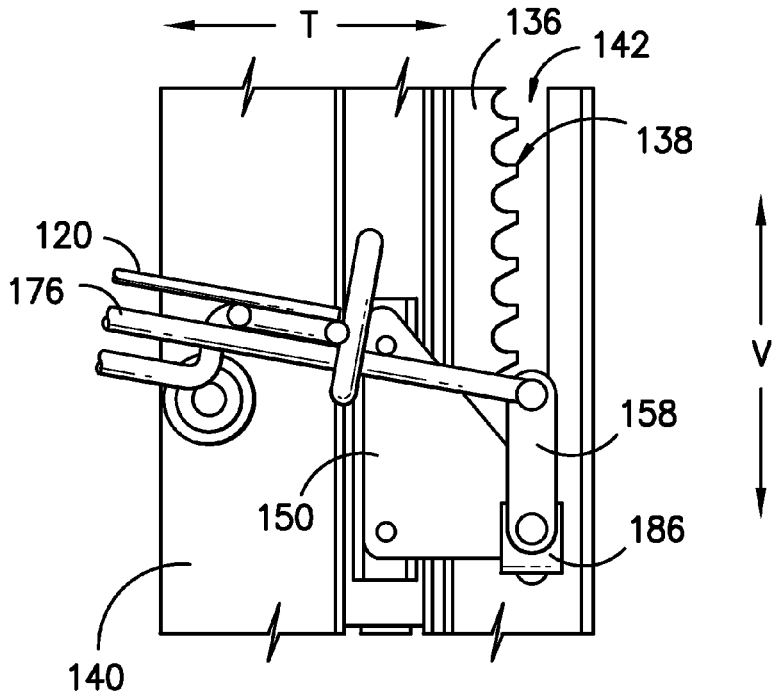
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FIG. –9–

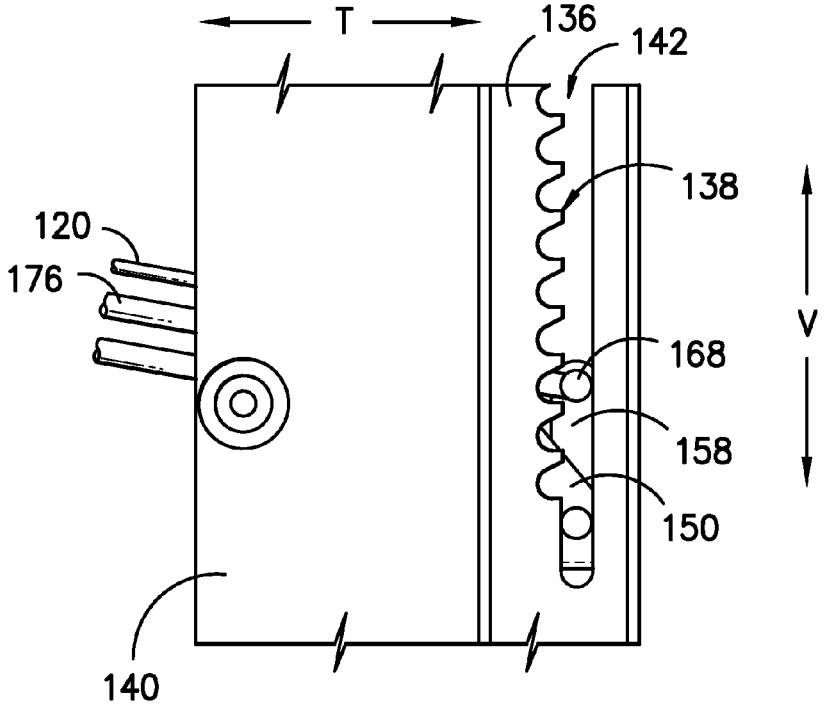
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FIG. –10–

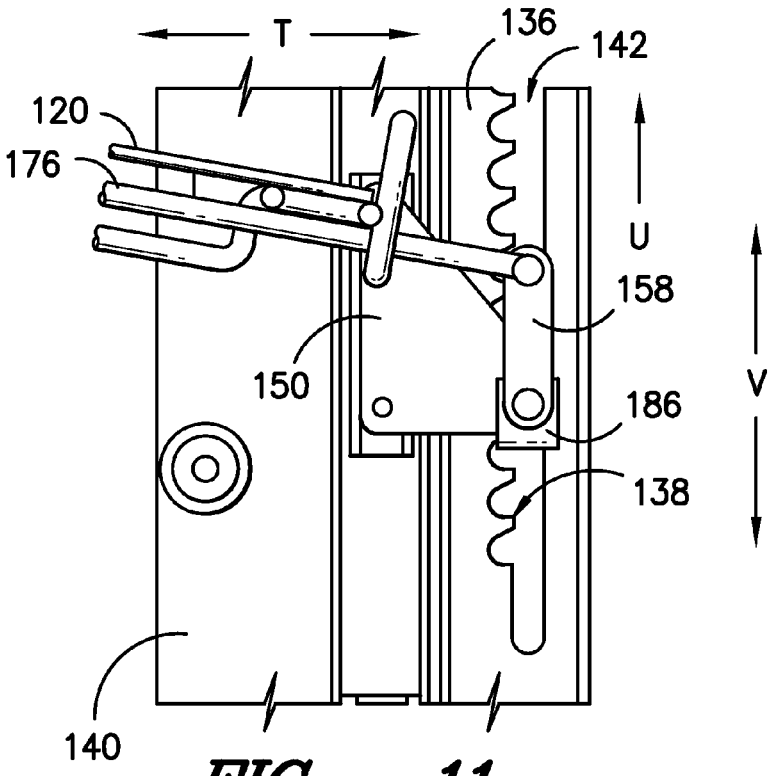
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FIG. —11—

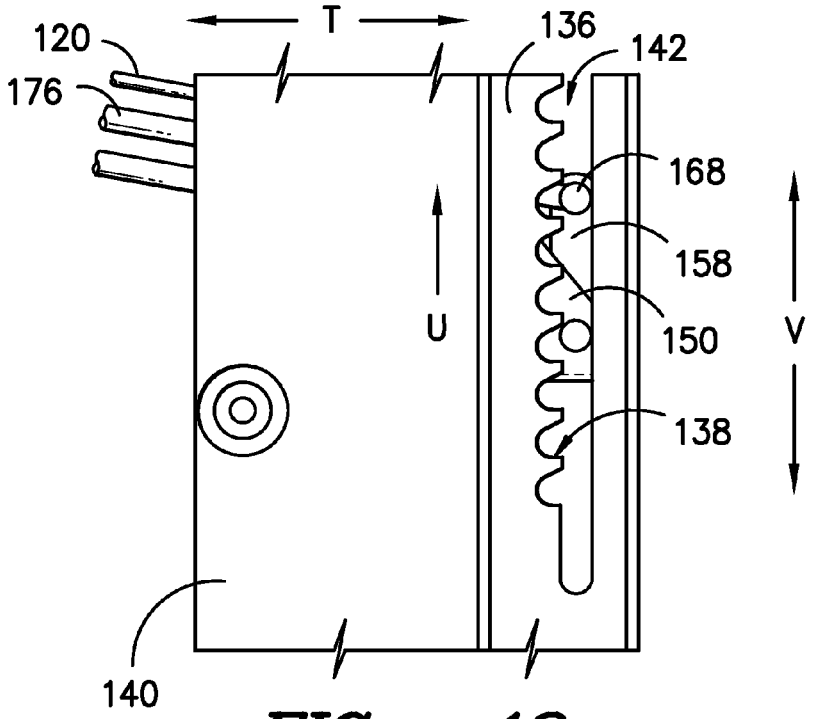
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FIG. —12—

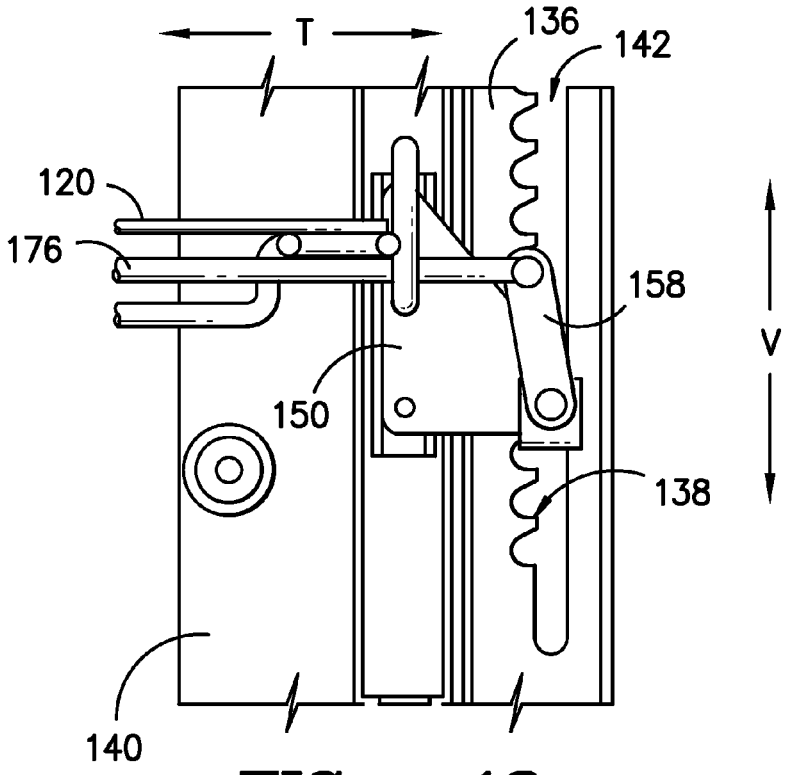
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FIG. –13–

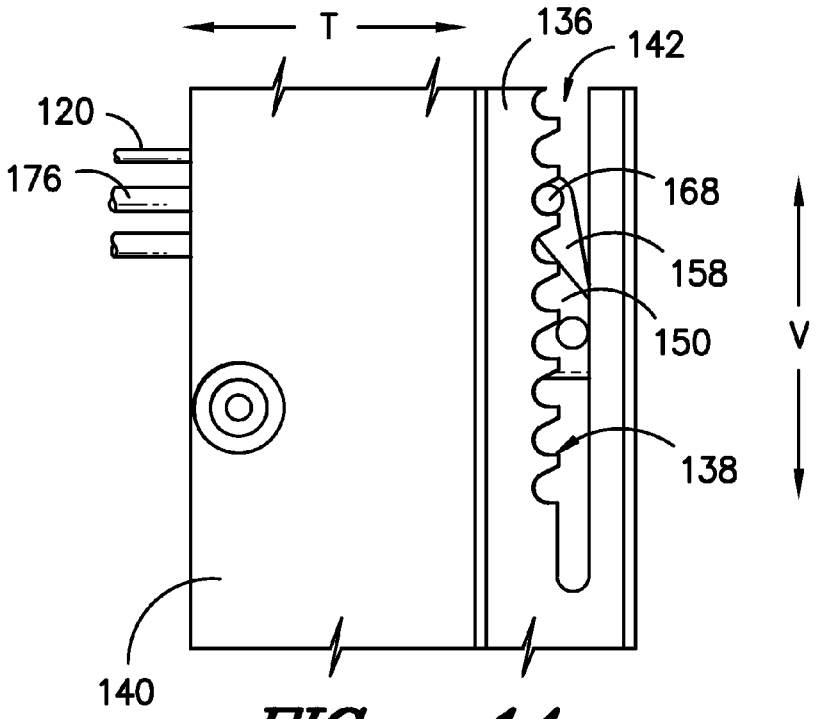
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FIG. –14–

APPLIANCE WITH VERTICALLY ADJUSTABLE RACK

FIELD OF THE INVENTION

The subject matter of the present disclosure relates to an appliance with one or more features providing for the adjustability of the vertical position of a shelf or rack.

BACKGROUND OF THE INVENTION

Oven appliances conventionally include one or more racks whereby multiple food items can be placed into the oven for cooking operations. In order to accommodate food items and cooking utensils of different sizes, a typical construction includes horizontal protrusions formed directly into the side walls of the oven cavity on which the racks can be slid in and out of the oven cavity. The racks and protrusions are designed so that the user can remove the rack from the protrusions at one vertical level and reinstall the rack at a different vertical level, which the user may select based on e.g., the height of the food items or utensils, the number of items being cooked, the type of food being cooked, and/or other factors.

Such conventional design may present challenges to some users of the appliance, however. For example, some users may find the removal and reinstallation of the rack so as to adjust the vertical height to be cumbersome or difficult. Additionally, the protrusions are commonly formed by stamping metal sheets to form the side walls of the oven cavity. The number of vertical levels may be limited to e.g., only four or five within the oven cavity. Thus, the amount of vertical adjustability can be quite limited and, therefore, unsatisfactory to some users.

Other systems have been proposed to provide vertical adjustability for the racks or shelves within an appliance. Typically, however, these constructions are also limited to fixed number of a relatively few locations at which the racks or shelves can be placed within the appliance. Some constructions may also have limitations on the amount of weight that can be supported.

Accordingly, an appliance having vertically adjustable racks or shelves would be useful. An appliance also having features that allow for an increased selection of vertical locations to which the racks of shelves can be adjusted would also be useful.

BRIEF DESCRIPTION OF THE INVENTION

The present invention provides an appliance having one or more racks or shelves, the position of which may be adjusted vertically. Multiple different positions along the vertical direction can be made available for selection by a user of the appliance. The rack can also be supported from multiple locations to increase its load capacity. Additional aspects and advantages of the invention will be set forth in part in the following description, or may be apparent from the description, or may be learned through practice of the invention.

In one exemplary embodiment, the present invention provides an oven appliance that includes a cabinet defining an oven cavity for the receipt of food items for cooking, the cabinet includes a pair of opposing side walls, a rear wall, and an opening for accessing the oven cavity. A pair of primary rack gears are provided with each primary rack gear positioned adjacent one of the opposing side walls and extending along a vertical direction. Each primary rack gear includes a plurality of gear teeth arranged along the vertical direction. This embodiment also includes a pair of slides with each slide positioned adjacent one of the opposing side walls, proximate to one of the primary rack gears and extending along a vertical direction. A pair of runners are provided with each runner slidably received into one of the slides and configured for sliding movement along the vertical direction on the slides. A pair of positioning cars are included with each positioning car connected to one of the runners along a first side of the positioning car.

Each of the positioning cars in this exemplary embodiment includes a pivot arm carried by a second side of the car, the pivot arm rotatable relative to the second side of the car; and a primary boss extending from the pivot arm. A latch mechanism is connected with the pivot arm of one or both of the pairs of positioning cars. The latch mechanism is configured for selectively causing the pivot arm of each car to rotate relative to such car so that each primary boss can be moved between i) a first position wherein the primary boss is engaged with at least one of the plurality of teeth of one of the primary rack gears so as to fix the latch mechanism at a selected position along the vertical direction, and ii) a second position wherein the primary boss is disengaged from the plurality of teeth of one of the primary rack gears so that the latch mechanism may be moved to another selected position along the vertical direction by sliding the pair of positioning cars along the vertical direction. A rack extends between the opposing side walls with the rack supported upon the latch mechanism.

In another exemplary embodiment, the present invention provides an appliance defining lateral, vertical, and transverse directions. The appliance includes a cabinet defining a cavity and including a pair of opposing side walls and a rear wall extending laterally between the opposing side walls. A rack is located in the cavity of the cabinet. A rack support assembly is provided for positioning the rack along the vertical direction in the cavity. Along each of the opposing side walls the rack support assembly includes a rack gear comprising a plurality of teeth, the rack gear positioned adjacent to one of the opposing side walls and extending along the vertical direction; a track extending along the vertical direction and parallel to the rack gear; and a positioning car carried on the track. The positioning car includes a pivot arm having a first end and a second end and a primary boss extending from the first end of the pivot arm. The pivot arm is rotatable about the second end between i) a first position where the primary boss rests upon the plurality of teeth of one of the rack gears so as to fix the vertical position of the rack support assembly, and ii) a second position where the primary boss is removed from the plurality of teeth of one of the rack gears so that the rack support assembly can be selectively moved along the vertical direction. A latch mechanism is connected with the pivot arm. The rack is supported upon the latch mechanism.

These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures, in which:

FIG. **1** is a front view of an exemplary embodiment of an oven appliance of the present invention.

FIG. **2** is a perspective view of an exemplary appliance cabinet, as may be used in the oven of FIG. **1**, shown with an oven cavity incorporating an exemplary embodiment of a vertically adjustable oven rack support assembly of the present invention.

FIG. **3** is a cross-sectional view (taken along line **3-3** as shown in FIG. **5**) of the exemplary appliance cabinet and support assembly of FIG. **2**.

FIG. **4** is an exploded, perspective view of the exemplary embodiment of a vertically adjustable oven rack support assembly shown in FIG. **2**.

FIG. **5** provides a front view of the exemplary oven cabinet and oven rack support assembly of FIGS. **2** and **3**.

FIG. **6** is a close up, front view of a portion of the exemplary oven rack support assembly shown in FIG. **5**.

FIGS. **7**, **9**, **11** and **13**, are close up, side views of a portion of the exemplary oven rack support assembly shown in FIGS. **2** through **6** as taken along line **7-7**. FIGS. **7**, **9**, **11**, and **13** illustrate the movement of certain exemplary features as an oven rack is raised from one vertical position to another.

FIGS. **8**, **10**, **12**, and **14** are close up, side views of a portion of the exemplary oven rack support assembly shown in FIGS. **2** through **6** as taken along line **8-8** in FIG. **6**. FIGS. **8**, **10**, **12**, and **14** provides a close up of the same features as FIGS. **7**, **9**, **11**, and **13**, respectively, but from an opposing side view.

DETAILED DESCRIPTION OF THE INVENTION

Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

Referring to FIG. **1**, an exemplary embodiment of an oven **100** according to the present invention is shown. FIG. **1** provides a front view of oven **100** while FIG. **2** provides a partial perspective view into the cabinet **102** of oven **100**, which defines an exemplary cooking chamber or cavity **104** into which a vertically adjustable oven rack (or oven shelf) support assembly **106** has been installed. As used herein, "rack" is not limited to elongated wire structures and includes shelves constructed from other materials such as expanded metal and others. Accordingly, "rack" and "shelf" (and the plural forms thereof) are used interchangeably herein.

Oven **100** includes a door **108** with handle **110** that provides for opening and closing access to oven cavity **104** through opening **98** at the front **96** of cavity **104**. A user of the appliance **100** can place a variety of different items to be cooked in oven cavity **104**, which is defined a pair of opposing side walls **112**, bottom wall **114**, top wall **116**, and rear wall **118** that extends laterally between opposing side walls **112**. Multiple oven shelves or racks **120** can be positioned within cavity **104** (only one rack **120** is shown) on rack support assembly **106**. The support and height adjustability of rack **120** using assembly **106** will be further described.

One or more heating elements (not shown) can be positioned e.g., at the top of chamber **104** to provide heat for cooking and cleaning. Such heating element(s) can be e.g., gas, electric, microwave, or a combination thereof. Other heating elements can be located at the bottom of chamber **104** as well. A window **122** on door **108** allows the user to view e.g., food items during the cooking process. For purposes of cooling, inlet **124** allows for an inflow of ambient air into a ventilation system while vent **126** allows for the outflow of such air after it has been heated by oven **100**.

Oven **100** includes a user interface **128** having a display **130** positioned on top panel **132** with a variety of controls **134**. Interface **128** allows the user to select various options for the operation of oven **100** including e.g., temperature, time, and/or various cooking and cleaning cycles. Operation of oven appliance **100** can be regulated by a controller (not shown) that is operatively coupled i.e., in communication with, user interface panel **128**, heating element(s), and other components of oven **100** as will be further described.

For example, in response to user manipulation of the user interface panel **128**, the controller can operate one or more heating element(s). The controller can receive measurements from a temperature sensor (not shown) placed in oven cavity **104** to e.g., provide a temperature indication to the user with display **130**. By way of example, the controller may include a memory and one or more processing devices such as microprocessors, CPUs or the like, such as general or special purpose microprocessors operable to execute programming instructions or micro-control code associated with operation of appliance **100**. The memory may represent random access memory such as DRAM, or read only memory such as ROM or FLASH. In one embodiment, the processor executes programming instructions stored in memory. The memory may be a separate component from the processor or may be included onboard within the processor.

The controller may be positioned in a variety of locations throughout appliance **100**. In the illustrated embodiment, the controller may be located under or next to the user interface **128** or otherwise within top panel **132**. In such an embodiment, input/output ("I/O") signals are routed between the controller and various operational components of appliance **100** such as heating element(s), controls **134**, display **130**, sensor(s), alarms, and/or other components as may be provided. In one embodiment, the user interface panel **128** may represent a general purpose I/O ("GPIO") device or functional block.

Although shown with touch type controls **134**, it should be understood that controls **134** and the configuration of appliance **100** shown in FIG. **1** is provided by way of example only. More specifically, user interface **128** may include various input components, such as one or more of a variety of electrical, mechanical or electro-mechanical input devices including rotary dials, push buttons, and touch pads. The user interface **128** may include other display components, such as a digital or analog display device designed to provide operational feedback to a user. The user interface **128** may be in communication with the controller via one or more signal lines or shared communication busses. Also, oven **100** is shown as a wall oven but the present invention could also be used with other appliances such as e.g., a stand-alone oven, an oven with a stove-top, and non-oven appliances as well.

Referring now of FIGS. **2**, **3**, **4**, and **5**, for this exemplary embodiment, oven rack support assembly **106** includes a pair of primary rack gears **136**. Each rack gear **136** is positioned adjacent to (and may be attached to) one of the opposing side walls **112**, and each extends along vertical direction V. Each primary rack gear **136** includes a plurality of gear teeth **138** that are also arranged along vertical direction V and, for this exemplary embodiment, are oriented towards the adjacent rear wall **118**. For this exemplary embodiment, the number and configuration of gear teeth **138** along rack gear **136** deter-

mines the amount of vertical adjustability including the number of positions at which rack **120** can be placed along vertical direction V. Other orientations and shapes for gear teeth **138** may also be used in other embodiments of the invention.

For this exemplary embodiment, each rack gear **136** is stamped and punched from a metal plate or sheet **140** and defines a vertical slot **142** adjacent to gear teeth **138**. Other constructions for providing rack gears **136** with teeth **138** may be used as well such as e.g., molded or cast constructions to provide a rack gear and associated teeth. Notably, rack gear **136** extends the full height of oven cavity **104** along vertical direction V in order to maximize the amount of adjustability and usable space for one or more oven racks **120**. Shorter rack gears could also be used.

A pair of slides **144** are positioned proximate to rack gears **136**. Each slide **144** is located adjacent to (and may be attached to) one of the opposing side walls **112**. Each slide **144** extends along vertical direction V in a manner that is parallel to a respective rack gear **136**. For this exemplary embodiment, a C-shaped channel or track **146** is formed in each slide **144**.

A runner **148** is slidably received into each slide **144**. More specifically, each runner **148** can move vertically along a respective slide **144**. In one exemplary embodiment, ball bearings (not shown) may be provided between runner **148** and slide **144** to facilitate movement of runner **148** up and down within track **146**. Other constructions for runner **148** and slide **144** may be used as well.

Referring now to FIGS. **6** and **7** as well as the preceding figures, a pair of positioning cars **150** are provided with one car **150** connected to each runner **148** along a first side **152** of each car **150**. First side **152** is oriented towards the front **96** of oven cavity **104**. Car **150** moves with its respective runner **148** as it moves on a slide **144** along vertical direction V.

As shown in the figures, each paired runner **148** and car **150** are depicted as separate components connected by fasteners **156** for this exemplary embodiment. Using the teachings disclosed herein, one of skill in the art will understand that other construction may be used as well. For example, runner **148** and positioning car **150** may be constructed as an integral component such that positioning car **150** is carried directly onto track **146** provided by slide **144** and is slidable along vertical direction V. Other constructions may also be used.

As shown in FIGS. **3**, **7**, and **8**, each positioning car **150** includes a pivot arm **158** that is carried by the second side **154** of positioning car **150** and is rotatable relative to car **150** (arrows R in FIG. **7**). More specifically, each pivot arm **158** includes a first end **162** and a second end **164** (FIG. **7**). A lower elongate rod **160** extends along lateral direction L between a pair of distal ends **166** (FIG. **4**). Each distal end **166** extends through the second side **154** of a respective positioning car **150** and is connected to the second end **164** of a respective pivot arm **158**. Each distal end **166** also extends through a U-shaped bracket **186**, connected to second side **154** of positioning car **150** to provide additional reinforcement in supporting rack **120**. Pivot arm **158** is rotatable or pivotable about its second end **164** with each distal end **166** of lower elongate rod **160** serving as a pivot point.

A primary boss **168** (FIGS. **4**, **6**, and **8**) extends from the first end **162** of each pivot arm **158**. More specifically, an upper elongate rod **170** extends along lateral direction L between a pair of distal ends **172** that each define a primary boss **168**. For this exemplary embodiment, distal ends **172** of upper elongate rod **170** are inserted through the first end **162** of each pivot arm **158** to create primary boss **168**. Distal ends **172** of upper elongate rod **170** are welded or otherwise affixed to pivot arm **158** to prevent rotation. Other constructions may be used to provide for the primary boss **168** extending from first end **162** of each pivot arm **158**, it being understood that the figures illustrate an exemplary embodiment.

As best seen in FIGS. **3** and **4**, oven rack support assembly **106** includes a latch mechanism **174** upon which rack **120** is supported or positioned. Latch mechanism **174** includes lower elongate rod **160** and upper elongate rod **170**, which are connected with pivot arms **158** as previously described. Latch mechanism **174** also includes a pair of struts **176** that extend along transverse direction T between rear wall **118** and front opening **98** of oven cavity **104**. For this exemplary embodiment, struts **176** each include a hook or U-shaped portion **178**, the function of which will be further described herein. A connecting strut **180** extends along the lateral direction between struts **176** to provide further strength for latch mechanism **174**. Rack **120** is can slide along transverse direction T relative to latch mechanism **174**, which may be convenient e.g., to a user placing an item for cooking onto rack **120**. Stops **182** (FIG. **4**) limit the amount of movement out of oven cavity **104** along transverse direction T while pins **184** prevent rack **120** from tipping when it is fully extended away from rear wall **118**.

Rack **120** can be fully supported on latch mechanism **174**, which is connected with the pairs of pivot arms **158** and positioning cars **150** as previously described. Once the pair of primary bosses **168** are engaged with gear teeth **138**, the interaction of the positioning cars **150** with slides **144** fixes rack **120** at the desired vertical level in oven cavity **104**. In a manner that will be further described, rack **120** can be repositioned by lifting the front **188** of rack **120** to disengage primary bosses **168** from teeth **138**—whereupon latch mechanism **174** and rack **120** can be moved by sliding cars **150** along slides **144** to another selected position along vertical direction V.

While the present invention includes exemplary embodiments where rack **120** is supported on latch mechanism **174** by primary rack gears **136** and slides **144**, additional support for rack **120** can be provided as shown in the figures. More particularly, referring to FIGS. **2**, **3**, and **4**, oven rack support assembly **106** can also be equipped with a pair of secondary rack gears **190** positioned adjacent opposing side walls **112** (and may be connected thereto) near the front **96** of cabinet **102**. Each secondary rack gear **190** includes a plurality of gear teeth **192** arranged along vertical direction V.

In order to engage gear teeth **192**, latch mechanism **174** further includes an actuator **194** configured in this exemplary embodiment as elongated rod **196** extending along the lateral direction L between a pair of ends **198**. Each end **198** provides a secondary boss **200** configured to engage gear teeth **192** of rack gears **190**. Actuator **194** also includes a pair of guide rods **202** that extend along transverse direction T towards rear wall **118**. Each guide rods **202** is each received into a respective spring **204** and then into an eyelet **206** attached to connecting strut **180**. Springs **204** urge secondary bosses **200** against the U-shaped portion **178** of struts **176** and into gear teeth **192**.

By depressing actuator **194** against springs **204**, secondary bosses **200** can be selectively moved between i) a first position (shown in FIG. **3**) where each secondary boss **200** engages the plurality of gear teeth **192** of secondary rack gear **190** to fix the vertical position of latch mechanism **174** and ii) a second position where each secondary boss **200** is disengaged from gear teeth **192** so that the vertical position of latch mechanism **174** may be moved along the vertical direction.

Accordingly, in order to reposition rack **120** as desired along the vertical direction, actuator **194** is depressed and the front **188** of rack **120** is lifted along vertical direction V. As front **188** of rack **120** is lifted, each primary boss **168** is moved

from a first position shown in FIGS. **7** and **8** to a second position shown in FIGS. **9** and **10**.

More specifically, FIGS. **7** and **8** illustrate a first position where primary boss **168** is engaged with gear teeth **138** of primary rack gear **136**, which fixes the position of latch mechanism **174** (and, therefore, rack **120**) along vertical direction V. In the second position shown in FIGS. **9** and **10**, pivot arm **158** is rotated or pivoted by the lifting of front **188** of rack **120** so that primary boss **168** is disengaged from the plurality of gear teeth **138** of the primary rack gear **136**.

As shown in FIGS. **11** and **12**, once each primary boss **168** is disengaged into the second position, latch mechanism **174** and rack **120** may be slid in slot **142** along vertical direction V to either raise or lower rack **120** as desired. For example, as indicated by arrow U, rack **120** may be raised vertically in the direction of arrow U to a different height selected by the user depending upon e.g., the height of food items and/or utensils to be placed in oven cavity **104**, the number of racks **120** the user desires to place in cavity **104**, and/or other factors as well.

Once the desired vertical height is reached, the front **188** of rack **120** is lowered. As front **188** is lowered, pivot arm **158** is rotated or pivoted. As a result, as shown in FIGS. **13** and **14**, primary boss **168** is reengaged with the teeth **138** of primary rack gear **136** to fix the vertical position of latch mechanism **174** and rack **120** at the selected vertical position. Actuator **194** can then be released to engage the secondary bosses **200** with the gear teeth **192** of secondary rack gears **190**. Similar steps can be used to further raise rack **120** or to lower rack **120**. As stated previously, because the rack gears are provided with multiple teeth, support assembly **106** provides for multiple levels of vertical adjustability.

The figures depict only one rack **120**. As will be understood by one of skill in the art using the teachings disclosed herein, multiple racks **120** may be placed within cavity **104**. Each rack **120** can be equipped with the oven rack support assembly **106** to provide adjustability as described herein. Racks **120** are provided by way of example only—racks or shelves of other constructions and shapes may also be used.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

What is claimed is:

1. An oven appliance, comprising:

a cabinet defining an oven cavity for the receipt of food items for cooking, the cabinet comprising a pair of opposing side walls, a rear wall, and an opening for accessing the oven cavity;

a pair of primary rack gears, each primary rack gear positioned adjacent one of the opposing side walls and extending along a vertical direction, each primary rack gear comprising a plurality of gear teeth arranged along the vertical direction;

a pair of slides, each slide positioned adjacent one of the opposing side walls, proximate to one of the primary rack gears and extending along a vertical direction;

a pair of runners, each runner slidably received into one of the slides and configured for sliding movement along the vertical direction on the slides;

a pair of positioning cars, each positioning car connected to one of the runners along a first side of the positioning car, each of the positioning cars comprising

a pivot arm carried by a second side of the car, the pivot arm rotatable relative to the second side of the car;

a primary boss extending from the pivot arm;

a latch mechanism connected with the pivot arm of one or both of the pairs of positioning cars, the latch mechanism configured for selectively causing the pivot arm of each car to rotate relative to such car so that each primary boss can be moved between

a first position wherein the primary boss is engaged with at least one of the plurality of teeth of one of the primary rack gears so as to fix the latch mechanism at a selected position along the vertical direction, and

a second position wherein the primary boss is disengaged from the plurality of teeth of one of the primary rack gears so that the latch mechanism may be moved to another selected position along the vertical direction by sliding the pair of positioning cars along the vertical direction; and

a rack extending between the opposing side walls, the rack supported upon the latch mechanism.

2. An oven appliance as in claim **1**, wherein each pivot arm comprises a first end and a second end spaced apart from each other along the pivot arm, and wherein the latch mechanism further comprises:

a lower elongate rod extending along the lateral direction between a pair of ends, wherein each end is inserted through the second side of one of the positioning cars and is connected to one of the pivot arms, each pivot arm being pivotable about its second end.

3. An oven appliance as in claim **2**, wherein the latch mechanism further comprises:

an upper elongate rod extending along the lateral direction between a pair of ends with each end of the upper elongate rod defining one of the primary bosses, each end of the upper elongate rod connected with the first end of one of the respective pivot arms.

4. An oven appliance as in claim **1**, wherein the pair of primary rack gears are attached to the pair of opposing side walls of the oven cavity.

5. An oven appliance as in claim **1**, wherein the pair of slides are attached to the pair of opposing side walls of the oven cavity.

6. An oven appliance as in claim **1**, wherein the oven cavity defines a transverse direction, and wherein the rack is slidable along the transverse direction relative to the latch mechanism.

7. An oven appliance as in claim **1**, further comprising:

a pair of secondary rack gears, each secondary rack gear positioned adjacent one of the opposing side walls and near the opening of the oven cavity, each secondary rack gear comprising a plurality of gear teeth arranged along the vertical direction; and

a pair of secondary bosses, each secondary boss connected with the latch mechanism and configured for selective movement between

a first position where each secondary boss engages the plurality of teeth of one of the secondary rack gears to fix the position of the latch mechanism along the vertical direction, and

a second position where each secondary boss is disengaged from one of the secondary rack gears so that the latch mechanism may be moved to another selected position along the vertical direction.

8. An oven appliance as in claim **7**, wherein the oven cavity defines a transverse direction, and wherein the latch mechanism further comprises:

a pair of struts, each extending along a transverse direction to engage at least one of the secondary bosses.

9. An oven appliance as in claim **8**, wherein each strut includes a U-shaped portion, and wherein the latch mechanism further comprises

a pair of springs, each of said springs urging at least one of the secondary bosses against the U-shaped portion of at least one of the pair of struts.

10. An oven appliance as in claim **9**, further comprising a connecting rod extending along the lateral direction between a pair of ends that define the secondary bosses.

11. An appliance defining lateral, vertical, and transverse directions, the appliance comprising:

a cabinet defining a cavity and including a pair of opposing side walls and a rear wall extending laterally between the opposing side walls;

a rack located in the cavity of the cabinet;

a rack support assembly for positioning the rack along the vertical direction in the cavity, wherein along each of the opposing side walls the rack support assembly comprises

a rack gear comprising a plurality of teeth, the rack gear positioned adjacent to one of the opposing side walls and extending along the vertical direction;

a track extending along the vertical direction and parallel to the rack gear;

a positioning car carried on the track, the positioning car comprising

a pivot arm having a first end and a second end;

a primary boss extending from the first end of the pivot arm, wherein the pivot arm is rotatable about the second end between

a first position where the primary boss rests upon the plurality of teeth of one of the rack gears so as to fix the vertical position of the rack support assembly, and

a second position where the primary boss is removed from the plurality of teeth of one of the rack gears so that the rack support assembly can be selectively moved along the vertical direction; and,

a latch mechanism connected with the pivot arm, the rack supported upon the latch mechanism.

12. An appliance as in claim **11**, wherein along each of the opposing side walls the rack support assembly further comprises:

a runner slidably received into the track and configured for movement relative to the track along the vertical direction, wherein the positioning car is attached to the runner.

13. An appliance as in claim **11**, wherein the pivot arm comprises a first end and a second end spaced apart from each other along the pivot arm, and wherein the latch mechanism further comprises:

a lower elongate rod extending along the lateral direction between a pair of ends, wherein each end is inserted through one of the positioning cars and is connected to one of the pivot arms, each pivot arm being pivotable about its second end.

14. An appliance as in claim **13**, wherein the latch mechanism further comprises:

an upper elongate rod extending along the lateral direction between a pair of ends with each end of the upper elongate rod defining one of the primary bosses, each end of the upper elongate rod connected with the first end of one of the respective pivot arms.

15. An appliance as in claim **11**, wherein the rack is slidable along the transverse direction relative to the latch mechanism.

16. An appliance as in claim **11**, further comprising:

a pair of secondary rack gears, each secondary rack gear positioned adjacent one of the opposing side walls and near the opening of the cavity, each secondary rack gear comprising a plurality of gear teeth arranged along the vertical direction; and

a pair of secondary bosses, each secondary boss connected with the latch mechanism and configured for selective movement between

a first position where each secondary boss engages the plurality of teeth of one of the secondary rack gears to fix the position of the latch mechanism along the vertical direction, and

a second position where each secondary boss is disengaged from one of the secondary rack gears so that the latch mechanism may be moved to another selected position along the vertical direction.

17. An appliance as in claim **16**, wherein the latch mechanism further comprises:

a pair of struts, each extending along a transverse direction to engage at least one of the secondary bosses.

18. An oven appliance as in claim **17**, wherein each strut includes a U-shaped portion, and wherein the latch mechanism further comprises

a pair of springs, each of said springs urging at least one of the secondary bosses against the U-shaped portion of at least one of the pair of struts.

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